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occur in healthy animals.——The cause of the movements of bacteria has been studied by Van Tieghem; while the ultimate cause is the contractility of the protoplasm, he thinks it is immediately due to the prolongation in places of filiform structures, to which he gives the name of appendages. These, he thinks, he has demonstrated to be the cause rather than vibratile cilia protruding through the cell wall.——A series of mycological preparations for the microscope of great value in the study of minute fungi have been made for sale by Dr. Zimmermann, of Chemnitz, in Saxony, Prussia.——The prospectus is issued of a proposed *Botanisches Central-blatt*, edited by Dr. O. Uhlworm of Leipzig. It is to be a weekly publication, consisting of information, reports, and abstracts of all papers in the various branches of botanical science published in Europe or America, titles of new books, etc. (*A. W. B.*)——The advance of the British troops into Affghanistan last year has not been without some scientific results. General Robert's force was accompanied by a naturalist, Dr. Aitcheson, who made large collections of plants, principally in the Kurum valley. These have been sent home and examined at Kew, and point to the interesting fact that in this valley we have a meeting point and intermingling of three very distinct floras, those of Western Asia, of India, and of Thibet.—(*A. W. B.*)

ZOÖLOGY.[1]

NOTES ON CALIFORNIA FISHES.—*Salmonidæ.*—Among the Salmonidæ that have occurred in the markets of San Francisco during September and October, the hump-back salmon, so-called from the prominent hump upon the back in advance of the first dorsal fin, has been conspicuous.

The anadromous salmon of this coast, that is, the salmon which ascend rivers to deposit their spawn but go to the sea to feed, belong to a different group from the well-known salmon of Europe and of the Atlantic coast. This latter (*Salmo salar*) is more nearly related to our brook troüts than to our salmon.

On account of the very long hooked jaw possessed by some of our Pacific salmon, they were grouped by Dr. Suckley under the generic name of *Oncorhynchus*, and by this name they are still known to naturalists. The character mentioned is not, however, the one to be relied on to distinguish these salmon, since the hooked jaws are only fully developed in the male sex after the spawning season; the females and young having straight jaws. This may be at once seen by a glance at the young *quinnat* (the common Californian salmon) now in the market. As they lie beside the old males with their excessive development of teeth and jaws, they seem a different species. The most reliable, obvious character, is the number of the anal rays, which in our

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[1] The departments of Ornithology and Mammalogy are conducted by Dr. ELLIOTT COUES, U. S. A.

Pacific coast salmon is seventeen, as in the European salmon and all trout.

Now there are five species of *Oncorhynchus* on this coast, and of these three are more or less hump-backed. All five are found in the Columbia, but they do not all inhabit Californian rivers. The common species, the *quinnat*, is not hump-backed. *Oncorhynchus nerka*, a somewhat hump-backed species with scales of about the same size as those of the *quinnat*, is on record from the rivers of California, but I have not yet detected its presence in our markets. This species grows as large as the common salmon, and is more cylindrical in form.

The hump-back now in the market is not this species. It has very small scales in more than two hundred transverse rows, is exceedingly compressed and thin in the body, has an excessively developed hump, and, so far as I have observed, does not reach the dimensions of the *quinnat*. These characters, taken together, prove that it is the species now known as *Oncorhynchus gorbuscha.*

I may here remark that the species of salmon and trout are probably more difficult to distinguish than those of any other tribe of fishes, partly because of the changes they undergo with age, and partly from seasonal and sexual changes. For example, the *quinnat* from the fresh water is light with round dark spots, from the sea it is of a bright steely blue. After the spawning season, as was previously observed, the lower jaw of the male acquires a more decided hook than usual. A careful examination of the teeth, of the gill-arches and of the pyloric appendages of the stomach has to be made in order to distinguish the species.

Early observers on this coast, relying on external characters, made the species much more numerous than they really are, founding their species on differences due to age, sex or season. Recently Profs. Gill and Jordan have reviewed the group, and the result is that the number of species is greatly reduced. *O. gorbuscha* includes the *gorbuscha* of Artedi, 1792, the *gibber* of Blon, 1801, and Suckley, 1861, and the *proteus* of Pallas, 1811. This is par excellence the hump-back salmon, does not attain a large size, and is on record as ranging from Washington to Kamtschatka. Its occurrence in our markets proves that in the autumn it visits the neighborhood of San Francisco. The dealers tell me it is taken in the Sacramento. *O. keta*, which is on record as ranging from Oregon to Kamtschatka, includes four nominal species described by various authors *(keta*, *lagocephalus*, *scouleri*, and *confluentus)*, while under *O. nerka*, which is reported to range from California to Kamtschatka, are included no less than ten nominal species, five of them described by Dr. Suckley. It is curious that the commonest species has, except when young, always been known by its Indian name of *quinnat.*

Notwithstanding the diminution in the apparent number of the Pacific coast Salmonidæ (taking the word in the sense it was used by the older naturalists), the Pacific coast can still lay claim to sixteen species, as follows:

Fresh-water Species.

Salmo irideus Gibbons, brook trout
" *henshawi* Gill and Jord., Lake Tahoe silver trout.
" *tsuppitch* Richards, black trout.
" *clarkii*, Columbia River salmon trout.
Salvelinus spectabilis, Gir. Charr or Dolly Varden trout.
" *bairdi*.
Coregonus williamsoni Gir., California white-fish.

Anadromous Species.

Oncorhynchus quinnat, common salmon, Quinnat.
" *nerka*, dog salmon.
" *keta*, Ekewan.
" *gorbuscha*, hump-back salmon.
" *kennerlyi*, red salmon.

Marine Species.

Osmerus elongatus Ayers, slender silver smelt.
" *thalichthys* Ayres, Curve-mouthed silver smelt.
Hypomesus olidus (Pallas) Gill, Small-mouthed Silver smelt.
Thalichthys pacificus Gir., Eulachon.

The first of these (*S. irideus*) although here reckoned as a fresh-water trout, appears to have acquired the habit, in some localities at least, of descending to the ocean in the autumn. Considerable quantities of what are called salmon trout are brought to market in September, and appear to be nothing more or less than *Salmo irideus*, changed in color by residence in salt water. This is, at least, the opinion of the more intelligent dealers, and is borne out by the external characters of proportion and form of head, body and fins.

The change of color is of the same kind as that produced in the more truly anadromous species, that is, the spots disappear in great part and a blue steely tint is spread over the body. *S. irideus* is the common trout of all Californian brooks and rivers.

The eulachon, previously mentioned, is also known as "candle fish," a name which it shares with two other fat fishes of totally different families, *Anoplopoma fimbria* and *Ammodytes personatus*. If the name be finally given to the fittest, the last of these should be the true "candle fish," since not only is it fat enough to furnish the Indians with a ready made candle, but it is of an elongated cylindrical form.—*W. N. Lockington.*

The English Sparrow in Newark, N. J.—The unusually mild weather which prevailed in the vicinity of New York city during the months of November and December, had the effect of starting the sparrows to housekeeping. About the 20th of the latter month I first noticed them carrying building material in the city of Newark, N. J., a proceeding which invited closer observation and attracted attention to their side-walk courtships, which were quite numerous, if not general.

The sparrows are very abundant in Newark, so much so that many owners of "brown stone fronts" have put up wire screens to keep them from nesting over the windows and doors, and many other buildings are rendered unsightly by their droppings. Houses are put up for these feathered Arabs, and in Newark, as in many other places, the fiction that the sparrow is an insectivorous bird is cherished, notwithstanding the fact that they can be seen seeking their food in the middle of the street, and that their short bills indicate a preference for grain.

Grace church is the best place in the city to study sparrows, its splendid ivy-covered sides being rendered unsightly by the straws and sticks which protrude from it all the way from ten feet from the ground to the eaves, in many places one to each square foot. The noise of this colony greatly interferes with the services, so much as to make it necessary, as I am informed, to close the windows in summer; and the walk in front, under the trees, is polluted by their droppings, and many dresses have thus been ruined.

Several nests were completed in the ivy on Grace church before the 10th of January, when a few days of cold and wet weather put a stop to further desire for housekeeping for a few days. It was renewed again from the 15th to the 20th, but just how far it had advanced by the time of the Christmas snowfall, I cannot say, as the nests are difficult of access; still the fact of their building would argue that if the weather had continued mild for a week or ten days longer a brood would have been the result.—*Fred. Mather.*

A NEW PRESERVATIVE FLUID.—About six months ago the German papers brought to notice that the conservator of the University of Berlin, Mr. Wickersheimer, had invented a fluid for preserving animal as well as vegetable tissues, which was said to surpass anything that had ever been used for that purpose. Mr. Wickersheimer's laboratory was reported to be the gathering-place of all sorts of scientists, who were unanimous in commending the extraordinary beauty and elegance of the specimens which Mr. Wickersheimer showed them, a number of which had been preserved for a considerable space of time. The well-known naturalist, Carus Sterne, reported in No. 22 of the "Gartenlaube" as follows:

" Mr. Wickersheimer has two ways of operating with his fluid. He either injects it into the veins of the body which is to be preserved, or soaks the whole object or any part of it in the fluid. By these methods the bodies are preserved from decomposition, and after having been taken out of the fluid and dried, their natural colors as well as the elasticity of the tissue and flexibility of all the joints are secured.

" Reporter saw the body of a boy which had died several months before, lying free in the open air and having perfectly preserved the appearance of a sleeping child. The body was of a natural softness and had preserved the appearance of life to a surprising degree.

" Mr. Wickersheimer showed a number of skeletons in which (the ligaments being preserved in their natural condition and elasticity) all the complicated movements could be executed and studied, of course much better than by aid of connecting wires and artificial joints. Some of the specimens showed beautifully the combined movements of the chest, the larynx and other parts in breathing. Several skeletons of snakes which had been treated with the fluid a year ago, allowed to show the spiral and undulatory movements of any part of the skeleton.

"But," the reporter continues, "not only the ligaments but also the vessels and membranes of animals will show the same indestructible softness and elasticity. The lungs thus prepared in connection with the wind-pipe may, even after years, be inflated by means of bellows. Such old lungs of several animals reporter saw swelling to ten times their size; the lobes became distinctly separate; the brown color gradually changed into red, and at length the whole body appeared as if taken from out of a fresh body.

"Also the digestive organs after having been cleaned, prepared and blown up, may be transformed into durable preparations which are undoubtedly far more instructive than any of those common imitations in papier-mâché.

" Further, the fluid offers great advantages for the preservation of such delicate objects which have to remain in a liquid medium. There is no discoloring, no shrinking of the objects as in alcohol (even when diluted). Sections of delicate tissues, morbid formations which have been removed by an operation, will appear after months as if in a fresh condition, and may thus be preserved for further study.

" Finally, all sorts of vegetable organisms, such as flowers, fruits, fungi, etc., will excellently preserve in this fluid and are sure to maintain their natural appearance for a long time. Reporter saw a colony of those delicate common fresh-water algæ which had been in the fluid for a year and had so beautifully preserved their green color that they appeared to grow in the water in their natural condition."

Some time previous to this report, Mr. Wickersheimer had offered his invention to the Prussian government for a reasonable compensation. The government accepted the offer and appointed a committee of experts to examine the fluid and test its qualities and effects. The very satisfactory results of these examinations have been quite recently published by the State's-Secretary of the Department of Instruction in the official "Staatsanzeiger," together with the following formula for the preparation of the fluid:

In 3000 grammes of boiling water dissolve

Alum	100 grammes.
Common Salt	25 "
Saltpetre	12 "
Potash	60 "
Arsenious Acid	10 "

After cooling and filtering, add to every ten litres of the solution, four litres of glycerine and one litre of methyl. alcohol.

The "Staatsanzeiger" says:

"The method of application differs according to the nature of the objects that are to be preserved. Anatomical preparations, whole bodies, etc., that are to be preserved dry, are laid (according to their size) from six to twelve days into the fluid, then taken out and dried in the open air. The ligaments, the muscles, etc., will now remain soft and flexible, so that at any time the natural movements can be executed.

"Hollow organs, such as the lungs, bowels, etc., must be filled with the preserving fluid, then laid in a vessel containing the same fluid and afterwards dried after the fluid has been poured out and the objects have been distended with air.

"Smaller animals, such as crabs, beetles, lizards, frogs, etc., if the natural colors are to be preserved unchanged, are not to be dried, but put up in the fluid.

"If human or animal bodies are to be preserved for a longer space of time before they are used for scientific purposes, it is sufficient to inject the fluid. Two litres, f. i., will suffice for a child of two years; about five litres are required for an adult. By this treatment the muscles will appear (even after years, when sections are made) as if in a fresh condition. If thus injected human bodies are preserved in the open air, they will gradually lose their fresh appearance and the epidermis will assume a brownish shade. But even this can be avoided if the fluid is externally rubbed into the skin, and if the access of air is prevented as far as possible.

"This latter treatment may be recommended for corpses that are to be exhibited to the public or are to be preserved for some time before they are buried, for the features will remain unchanged in their expression and color, and there will not any smell be perceptible.

"For the real embalming a method of combined injection and preservation in the fluid is to be applied. The bodies, after being injected, are kept in tight cases, being wrapped in clothes which have been saturated with the solution."—*W. Barbeck.*

THE SPOTTED SALAMANDER.—Every one who has collected water-plants or animals in the marsh-pools or quiet streams of the Eastern United States is familiar with the spotted salamander, or water newt (*Diemyctylus viridescens* R.).

In their adult dress (olive-brown above, yellow beneath, and a row of vermilion spots along each side) they can be seen in numbers, from early April till the middle of June, in shallow pools, basking on the surface, or floating motionless with the slow current, or walking among the submerged plants. It is the only salamander I know whose habits are so diurnal that it enjoys the sunshine. I have caught them by the dozen at noon on sunny days. In the spring they prefer open pools or streams of slow-moving water where there are no trees, but plenty of plants and tufts of grass. But later in the year, when the sun becomes torrid, when the streams of the marshes are shrunken, and temporary frog ponds are nothing but patches of dried and cracked mud, the adult spotted salamander is seldom seen. I suppose they are hidden among the roots and tufts of grass. At least my specimens in confinement always get in such places.

I have kept them in a box filled with earth, grass and moss, in which there was always a dish of water standing, but they did not care to stay long at a time in the water. Sometimes they would not remain in it for weeks, although they walked through it many times in crawling around; and they ate and were as lively as when caught.

In the breeding season, when they spend a greater part, if not all the time, in the water, their colors are brighter and the black markings are very distinct. The compressed tail has a fin-like extension of the integument above and below, which enables them to swim with ease. Afterwards the colors become dull and the fin is absorbed. In these particulars they resemble what is said of the *Triton* (?) *cristatus* of Europe.

The eggs, which I have seen, are glued singly in the axils of leaves, or the terminal whorl of finely-divided leaves, or folded up in grass blades. Often the leaves are stuck so close to the egg that the latter is not visible. Prof. E. D. Cope has noticed the eggs of *D. viridescens* "laid singly on leaves of Myriophyllum which adhere to the glutinous egg, concealing it." (Packard's Zoölogy, 1879, p. 479.) My observations differ from those of Prof. Verrill and S. J. Smith (AMERICAN NATURALIST, Vol. III, p. 158), who state that they found "rounded masses, like frogs' eggs, on the stems of water plants." The larvæ, too, that were hatched from the eggs they found had "rather stout bodies and broad heads." All the larvæ I ever saw of *D. viridescens* have been slender, with narrow heads and pointed noses. They can be distinguished at all times from the stout broad-headed larvæ of *Amblystoma punctatum.* I have caught adult specimens in the breeding season, placed them among plants where there were no eggs. They laid eggs in the axils of the plants, and the eggs hatched to larval spotted salamanders. In the manner of placing the eggs, they agree with what Prof. Owen says of the *Triton cristatus* and *L. punctatus*. The eggs are about an eighth of an inch long, elliptical, with a tough envelope, and greenish fluid surrounds the yolk part. They are laid early in April or May, according to the season. The larvæ are very timid. I have kept them till they became terrestrial and had yellow spots along their olive-green sides, but they would not eat, and died in about a week. I am very sorry not to have been able to keep any till they reached the red eft stage. Their dying so young makes a break in the chain of observed facts that prove the red eft to be a young form of the spotted salamander.

The red eft (*D. miniatus* Raf.) was described as a different species on account of its color, which is orange-red with vermilion spots. Lorne still holds that it is a distinct species, or a variety. Dr. Hallowell first suggested that they were the same species (Proc. Acad. Nat. Sci., 1856), and Prof. Cope has maintained the same opinion (Proceed. Phila. Acad., 1859). Mr. H. A. Kelly kept some red efts till they became spotted salamanders (AMERICAN NATURALIST, Vol. XII, p. 399). I have also observed the change several times. All the red efts I have seen were small. I believe, but am not able to prove at present, that the young *D. viridescens* attains its red garb the summer it is hatched, remains that color about a year, then gradually becomes duller as it attains full size. I have found red efts in dead wood some distance from water, but never in the water; I found one November 1, after two severe frosts, under a loose stone near a marsh. I have kept *D. viridescens*, *A. punctatum* and *Desmognathus fusca* alive for more than a year at a time. The first two species became so tame that they would stretch up their heads, expecting to be fed, whenever they heard my voice. I have seen *D. viridescens* eat tadpoles. They never seem to be able to get enough of them. The salamander puts his nose close up to the tadpole and remains perfectly still. If the tadpole does not stir, his life is saved, for the salamander soon moves off; but if he wriggles the least bit he is down the throat of his enemy in an instant. In taking bits of meat from a wire, they slowly open the mouth, protrude the tongue, and gently pull it off. *A. punctatum* snaps off the meat with a quick jerk.

I have never seen any salamanders use the fore foot as a hand in adjusting food in the mouth, or for removing objectionable pieces, but I have very often seen my tree toads do so.

I have frequently seen the *D. viridescens* shed its skin. They are restless before shedding and refuse food, and are weak for some time after the skin is removed. After the skin is loosened, they press it from the head and front legs by rubbing against some projection in the box, presenting different sides during the operation. Sometimes they remove the whole skin in this manner. At other times, after the old skin was removed from the arms, I have seen them push it from the rest of the body by alternately pressing against the sides with their hand-like front feet, in the same way that a person might strip off a tight garment. The skinning takes an hour or more, and after the integument is off they roll it up and swallow it.

If kept in a warm room salamanders take food regularly during the winter and seem as lively as in summer. Tree toads kept in the same room will not eat. On the approach of cold weather they dig their way under sods and remain buried and torpid till spring. This would indicate that hybernation is not as settled a habit with these two species of salamanders as with the tree toads.—*S. P. Monks.*

GROWTH AS A FUNCTION OF CELLS.—Dr. Charles Sedgwick Minot has published an article in the Proceedings of the Boston Society of Natural History on " Growth as a Function of Cells." This essay is an attempt to give an exact analysis of the problem of growth. The author considers that growth depends upon an impulse created at the time when the *ovum* is impregnated; this impulse he terms rejuvenation, because the vital power is made young again in a new cycle of cells. The old cycle of cells passes away, the parent dies, but a new egg-cell is produced endowed with an extraordinary power of division, which causes the birth of successive generations of cells. Now usually the number of cells is doubled at every division, that being the least possible increase, hence the number of cells must increase in geometrical progression; therefore, the growth of every animal would be indefinite were there not an opposing influence. This opposing influence cannot be the loss of a part of the cells, as when part of the skin peels off, for this loss is too slight to counterbalance the multiplication. The explanation is, that the intervals between the births of two successive generations of cells continually increases, or in other words the frequency of the divisions continually diminishes. This Dr. Minot calls the phenomenon of *senescence*, to which he attributes the utmost importance, as a vital phenomenon common to all animals, yet hitherto entirely unstudied. He says . " From our point of view this change (in the frequency of division) is the most important alteration produced by senescence; that it really occurs is not only a deduction, but is shown by actual observation, for no one can question that the division of the cells during segmentation of the yolk proceeds at shorter intervals than during adult life; thus in an egg say eight or ten, perhaps more, generations of cells may be born in the course of a single day, all the cells dividing; but we cannot for an instant imagine that all the cells of the human adult, for example, divide upon an average even once a day, probably * * * * not * * * * even once a year." But the size or weight of the whole animal depends not only upon the number but also on the volume and weight of the cells. Dr. Minot therefore discusses the laws which govern the variations of the size of cells. The relations of growth to the size of animals is next considered, the conclusion being drawn that the rapidity of the senescence determines the size of the animal, because the more rapidly the frequency of the cell divisions diminishes, the sooner will growth cease and the smaller will the animal remain, so that in this respect senescence exercises a fundamental influence. This, is, we believe, the only scientific attempt to explain the reason why animals are of different sizes. Finally by a novel reasoning the conclusion is drawn, that although the animal grows in three dimensions, yet the growth of the cells is confined to two dimensions of space. For the detailed arguments supporting the author's conclusions, the original article must be consulted.

SCOLOPENDRELLA AS THE TYPE OF A NEW ORDER OF ARTICULATES (SYMPHYLA).—In examining a series of specimens of *Scolopendrella notacantha* Gerv., and a species which I believe to differ from *S. immaculata* Newp., and which I have called *S. gratiæ* (both forms collected in the Philadelphia park), I find characters which appear to warrant the creation of an ordinal division for their reception. The new group may be characterized in accordance with my observations as follows:

Head essentially insectiform, or, more specifically, like that of *Campodea*, with *mandibles, maxillæ and apparently a ligula*. The labrum and labium are well defined, and the former is separated from the *epicranial pieces by a well-marked suture*. Antennæ 14–28 articulate. Body with thirteen segments (exclusive of head), to which are appended not more than twelve pairs of *five-jointed legs, each terminated by a pair of claws, as in insects. At the bases of each pair of legs a pair of simple hairy appendages are attached, except to the first or postcephalic:* these are fully three times as large in *S. gratiæ* as in the other species. Caudal stylets in a single pair, tapering, unjointed.

Genital orifice on the ventral side of the body opening on the third or fourth body-segment in both sexes. In one sex the opening is a *simple pore*, in the other a *longitudinal cleft*, closed by means of an oblong chitinous piece on either side, the two together occupying a subquadrate space. Heart, dorsal; *tracheal system represented by a series of simple tubular arches, without a spiral filament, which arise from openings on the ventral surface of the animal, inside the bases of the legs, widening and passing upwards to end apparently in close relation with the dorsal vessel. Intestine straight*, with two very long, tortuous malpighian tubules opening into it at the posterior third (*S. notacantha*).

The genital glands, as well as the nervous system, I have not made out with any degree of certainty. The muscles are distinctly striated, and the blood corpuscles small. The intestine has the portion in front of the rectum dilated; this is especially notable in *S. gratiæ*, where this part of the alimentary canal is usually filled with the remains of undigested vegetable food. The distal, thin, laminar elements of the jaws and maxillæ are deeply toothed and much resemble those of *Campodea*, as figured by Meinert.

This form, as interpreted above, becomes of the highest interest to the zoölogist, and if the writer is not mistaken, the biunguiculate legs and their nearly complete correspondence in number with the rudimentary abdominal and functional thoracic limbs of the *Thysanura*, especially *Machilis* and *Lepisma*, which also have basal appendages to the legs, indicate as much affinity with insects as with myriapods, and may indeed be looked upon, perhaps, as representing the last survival of the form from which insects may be supposed to have descended. I name the new group *Symphyla*, in reference to the singular combination of myriapodous, insectean and thysanurous characters which it presents.—*John A. Ryder.*

NOTE ON A LARVAL LITHOBIUS-LIKE MYRIAPOD.—I recently met with a very small specimen of this type of myriapod with seven pairs of legs. The claws are simple, as in the adults, the same as I have observed in larval specimens of *Julus* and *Trichopetalum*, and in both adult and immature specimens of *Eurypauropus*. The mouth parts are a miniature of those of the adult. The specimen was nearly an eighth of an inch long.—*J. A. R.*

TRICHOPETALUM.—I have found Harger's *T. lunatum* in great abundance in the Philadelphia park, which greatly extends the range of this Lysiopetalid myriapod.—*J. A. R.*

DR. CHAPMAN ON THE PLACENTA OF ELEPHAS.—The birth of an elephant at full term (twenty months and twenty days, according to the records kept by the keepers at Dr. Chapman's request), in Cooper & Bailey's menagerie in this city, afforded a unique opportunity to study the mature placenta of these huge animals. The placenta proper was found to be *zonary*, and was believed to have encircled the fœtal elephant during gestation. The amnion and chorion formed two large oblong pouches, one within the other and were fused together equatorially at their narrowest diameters, the point where the placental villi were developed. On either side of the placental zone of villi, the numerous cotyledons were developed. The placentation was found to be essentially non-deciduate, and diffuse in character, with a zonary form; this combination of characters renders Dr. Chapman's observations of great interest and systematic importance. No naturalist of recent times has ever had so good an opportunity to study this structure; the specimen described by Professor Owen is supposed, from its size, to have been immature, whilst the interpretations, figures, and descriptions of the parts by the older authors are necessarily unsatisfactory, owing to their lack of comparative knowledge.

Zoological News.—A new class of marine silicious Rhizopods, called by Haeckel *Phæodaria*, rich in specific forms and remarkable in many respects, is described in *Nature* by this indefatigable observer. Over 2000 " species " have been collected by the *Challenger* expedition. The greater number of the species are visible to the naked eye——The development of *Amblystoma punctatum* is described by Dr. S. Clarke, with excellent figures, in the Studies from the biological laboratory of the Johns Hopkins University.——Considerable has been done by the Scandinavian naturalists concerning the singular Crustacean parasites of the sea worms, these Lernæan forms being attached to the bodies of the worms. A number of new forms of much interest have been described and elegantly figured by Levinsen in the Proceedings of the Natural History Society of Copenhagen.——Hewitson and Moore's Descriptions of New Indian Lepidopterous insects is to appear in parts. For the first part we are indebted to Dr. Hayden. A number of forms are related to American species, hence this publication is of interest to lepidopterists in America.——The death of Dr. Boisduval, the well-known lepidopterist, who described so many North American butterflies and moths, is recorded. He attained the age of eighty-one years.

ANTHROPOLOGY.[1]

Peabody Museum at Cambridge.—Prof. F. W. Putnam, in three communications to the Boston Society of Natural History, during October and December gave an account of the work of the Peabody Museum. The first had reference to chambered barrows, already mentioned. The second to ancient mounds and burial places in Cumberland Valley, Tennessee. Several thousand ancient stone graves have been opened. A walled town on the Lindsley estate, twelve acres in extent, enclosed by a bank and ditch was described. A mound in the area contained sixty human skeletons, each in a carefully made stone grave, the graves being arranged in two rows forming four sides of a square, and in three layers. About seventy ground plans of ancient houses were traced out. Under the floors of hard burnt clay were the graves of children, from one to four under each house. The third paper treated of the ornamentation of pottery. The author concludes from a wide induction that the seemingly useless appendages of more refined ceramic ware are survivals of useful parts in a ruder age, and that the study of the ornamentation of pottery will furnish an important clue to the progress of culture.

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[1] Edited by Prof. Otis T. Mason, Columbian College, Washington, D. C.